

Description of a New Species of the Genus *Argyrodes* (Araneae: Theridiidae) from Orchid Island, Taiwan, with Notes on its Ecology and Behavior

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吉田 哉¹⁾, 卓 逸民²⁾, 劉 小如²⁾: 台湾蘭嶼産イソウロウグモ属
(クモ目: ヒメグモ科) の 1 新種の記載,
および生態と行動の記録

Abstract A new species, *Argyrodes lanyuensis* of the family Theridiidae is described from Orchid Island, Taiwan. The ecology and behavior of the new species are reported.

The Orchid Island, an area of 45 km² lies 91 km off the southeast coast of Taitung County, Taiwan. It is a small link in the chain of islands from the Philippines, Taiwan, Ryukyu, to Japan. Climate of Orchid Island is characterized by high temperature (average 22.4°C), high precipitation (more than 2,600 mm per year) and high relative humidity (more than 90% throughout the year). The dense forest on this island abounds in orchids which are used for the island name. Up to the present, only one species of spider, *Yamia watasei* Kishida, 1920, has been recorded.

In 1993, four species of the genus *Argyrodes* have been collected from this island. Three of them are recognized as *A. fissifrons* O. Pickard-Cambridge, 1869, *A. flavescens* O. Pickard-Cambridge, 1880, and *A. cylindrogaster* (Simon, 1888), that have been widely distributed in southeast Asia, Taiwan, and Japan, while the other is a new species that seems to live only on this island.

In this paper, we describe this new species of the genus *Argyrodes* and report its ecology and behavior.

The holotype and some paratypes of the new species are deposited in the collection of the Institute of Zoology, Academia Sinica, Taipei (ASIZ), and other paratypes are preserved in the National Science Museum (Natural History), Tokyo (NSMT) and first author's private collection (HY).

The abbreviations used in this paper are as follows: ALE, anterior lateral eye(s); AME, anterior median eye(s); MOA, median ocular area; PLE, posterior lateral eye(s); PME, posterior median eye(s).

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***Argyrodes lanyuensis* sp. nov.**
 (Figs. 1–9)

Male. Total length 3.47 mm. Carapace length 1.74 mm; width 0.79 mm. Abdomen length 1.89 mm; width 1.00 mm; height 1.11 mm. Length of legs as shown in Table 1.

Carapace elongated and flattened. Cephalic projection small, tapering to apex; clypeal projection large; concavity present between two projections (Figs. 1–2). AME and ALE larger than PME and PLE (4 : 3). AME five-fourths their diameter apart and three-fourths from ALE. PME eleven-sixths their diameter apart and five-sixths from PLE. ALE and PLE almost touching. MOA, anterior width: posterior width: length = 10 : 10 : 9 in the ratio. Leg formula 1, 2, 4, 3; first leg 2.5 times longer than second one. Abdomen longer than wide and high, extending far behind the spinnerets (Fig. 1). Palpal organ as shown in Figs. 5–6: embolus thin and long, forming a circle.

Coloration. Carapace dusky brown, clypeal projection a little lighter than rest of carapace. Chelicerae brown. Maxillae and labium dusky brown, pale distally. Legs dusky brown; coxae to basal part of femora yellowish brown; basal one-third of first and second metatarsi yellowish brown, distal two-thirds with black blotches. Dorsum of the abdomen gray with dusky blotches and silver pigments; venter almost dusky brown with distinct three silver pigments around the spinnerets and one near the posterior tip.

Female. Total length 2.58 mm. Carapace length 1.26 mm; width 0.89 mm. Abdomen length 1.37 mm; width 1.32 mm; height 1.84 mm. Length of legs as shown in Table 1.

Eyes almost equal in size. AME and PME each four-thirds their diameter apart and two-thirds from ALE and PLE. MOA, anterior width: posterior width: length = 18 : 18 : 15 in the ratio. Carapace without projection; clypeus a little concave. First leg 2.6 times longer than second one. Abdomen higher than long and wide; dorsum with median, wide, dusky brotch. Genital organ as shown in Figs. 7–8: epigynum with distinct two openings; seminal receptacles large; ducts thin and long, forming a spiral.

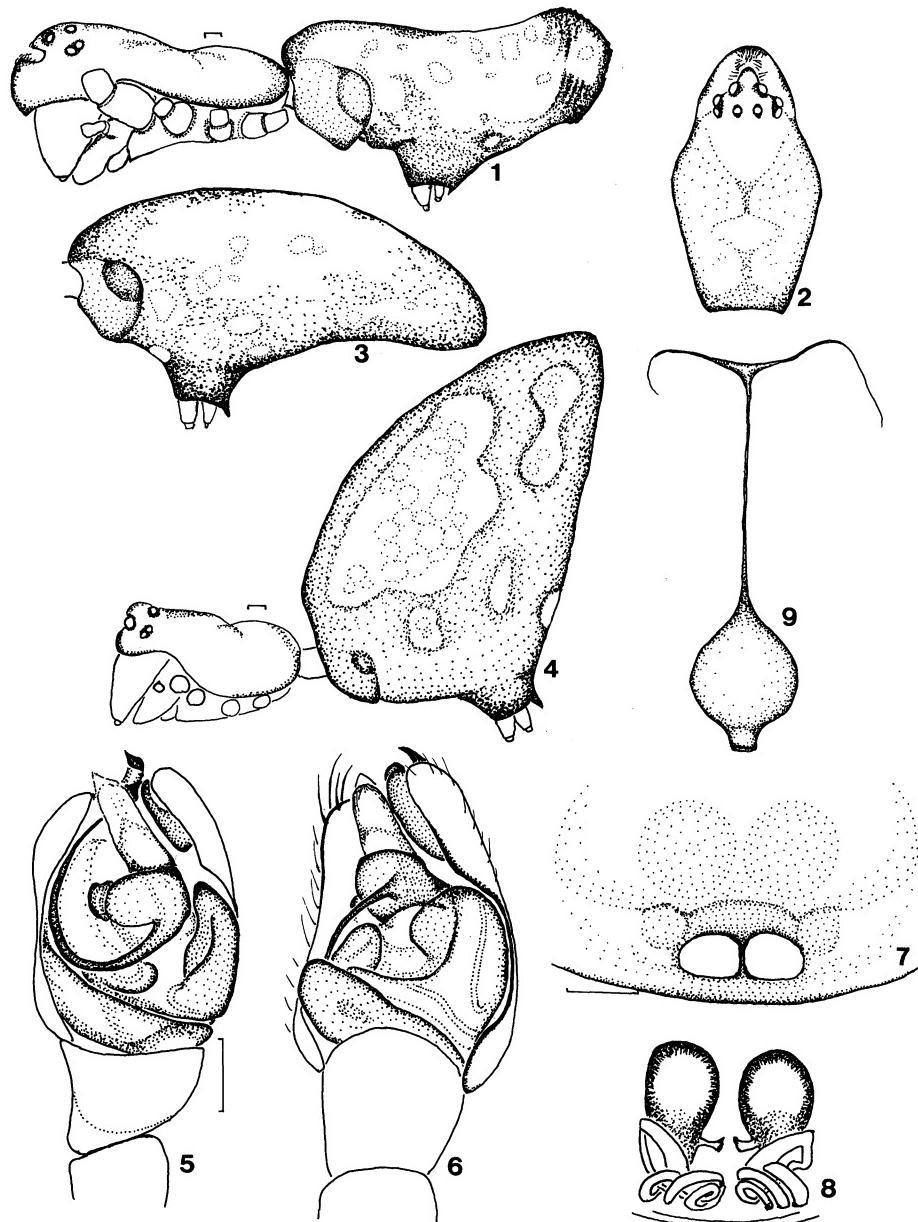
Other characters same as male.

Variation. Some male specimens have a very long abdomen, tapering to the posterior tip (Fig. 3). Total length 3.89 mm; carapace length 1.53 mm; abdomen length 2.37 mm.

Type series. Holotype: ♂, Chung-ai Bridge (22°00'N, 121°35'E), Orchid Island, Taitung County, Taiwan, 15-II-1997, I. M. Tso leg. (ASIZ-Ar 70001). Paratypes: 1 ♂, 2 ♀♀, same data as for the holotype (ASIZ-Ar 70002–70004); 1 ♀, same locality and collector, 18-III-1997 (ASIZ-Ar 70005); 1 ♂, 1 ♀, 2 ♀♀ juv., Orchid Island, 14-VIII-1993, H. Yoshida leg. (NSMT); 4 ♀♀, Orchid Island, 15-VIII-1993, H. Yoshida leg. (HY).

Table 1. Measurements of leg segments of *Argyrodes lanyuensis* sp. nov. (in mm, ♂ / ♀)

Leg	Femur	Patella + Tibia	Metatarsus	Tarsus	Total
I	3.89/3.05	3.79/3.05	3.58/2.79	1.32/1.16	12.58/10.05
II	1.63/1.21	1.53/1.21	1.16/0.84	0.66/0.58	4.98/ 3.84
III	0.79/0.68	0.71/0.58	0.47/0.42	0.37/0.34	2.34/ 2.02
IV	1.26/1.16	1.11/0.89	0.74/0.66	0.47/0.47	3.58/ 3.18



Figs. 1-9. *Argyrodes lanyuensis* sp. nov. —— 1. Male, lateral view (holotype); 2. male carapace, dorsal view; 3. male abdomen, lateral view (paratype); 4. female, lateral view; 5. male palpus, ventral view; 6. same, lateral view; 7. epigynum, ventral view; 8. female genitalia, dorsal view; 9. egg sac. (Scales: 0.1 mm.)

Distribution. Taiwan: Orchid Island.

Remarks. The present new species resembles *Argyrodes tripunctatus* Simon, 1877 described from the Philippines, but is distinguished from the latter by the abdomen with many silver pigments and the structure of the male carapace.

On Orchid Island, the other three species of *Argyrodes*, *A. fissifrons* O. Pickard-Cambridge, 1869, *A. flavesiensis* O. Pickard-Cambridge, 1880, and *A. cylindrogaster* (Simon, 1888), are different from the present new species in general appearances and genital organs. *A. flavesiensis* is a new member for the Taiwanese fauna.

Etymology. The specific name is made after the Chinese name of Orchid Island (Lan-yu).

Ecology and Behavior

Juvenile and adult *Argyrodes lanyuensis* sp. nov. can be seen all year round over Orchid Island on webs of araneid and theridiid spider hosts. Although *A. lanyuensis* forages in webs of other spiders, they build a separate tent web to place their egg sac. The egg sac (diameter around 3 mm) is white, spherical with a long stalk, which contains 43 eggs (examined one egg sac, Fig. 9). Because egg sacs can be seen every month, reproduction of *A. lanyuensis* seems to occur all year round. On Orchid Island, *A. lanyuensis* is most frequently seen in the orb and barrier webs of *Nephila maculata* (Fabricius, 1845). In some orbs of *N. maculata* up to twenty *A. lanyuensis* can be seen, but the average number of kleptoparasites is less than 10. *A. lanyuensis* on webs of *N. maculata* forages in two ways. First, larger individuals collect small prey (body length < 4 mm) ignored by the hosts. When small insects are trapped on orb, the vibration caused by struggling attracts *A. lanyuensis* to orient toward the prey. *A. lanyuensis* subdues the prey by both biting and wrapping, then carries the wrapped prey with a silk string away from host's orb to feed. Secondly, both large and small individuals consume silk of host's orb web. When consuming silk, *A. lanyuensis* weaves its long leg I while moving on host's orb to locate silk. When *A. lanyuensis* grabs the silk of host, it teases a fine filament from the silk thread, rolls the silk into a small ball then ingests it. Silk-consumption by *A. lanyuensis* may generate a 20% to 100% reduction in orb area spun by young *N. maculata* (Tso & Severinghaus, 1998). Perhaps silk-consumption is the major foraging mode of juvenile *A. lanyuensis*, and prey-consumption becomes more and more frequent as size of spider increases. *N. maculata* does not seem to pay attention to both kinds of foraging exhibited by *A. lanyuensis*. In addition to *N. maculata*, *A. lanyuensis* also invades orbs of *Gasteracantha mammosa* (C. Koch, 1793) and forages on both silk and small prey. Besides, *A. lanyuensis* is also found on webs of various species of *Cyrtophora* (Araneidae) and *Achaearanea* (Theridiidae) scavenging prey and consuming silk. Co-occurring with *A. lanyuensis* on the webs of those hosts is another kleptoparasite, *Argyrodes fissifrons*. While *A. lanyuensis* is the dominant kleptoparasite on webs of orb-weaving hosts, its density is much lower than that of *A. fissifrons* in the webs of *Cyrtophora* and *Achaearanea*.

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摘要

台灣蘭嶼産のヒメグモ科イソウロウグモ属の1新種 *Argyrodes lanyuensis* sp. nov. を記載し、生態と行動を合わせて記録した。

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